1   carried right through. In 1927, 75 years ago,

2   almost -- I forgot to look at the date, if today

3   were the date, I hope it's not the Chairman's

4   birthday, but it could be the birthday of the

5   Federal Radio Act, the drive to create to Federal

6   Radio Commission was largely on the backs of

7   incumbent broadcasters who wanted a federal agency

8   that would seize authority over AM radio and

9   prevent expansion of the AM radio band. That is,

10   spectrum policy was producing too much competition

11   in 1927 and we needed to use spectrum policy to put

12   a stop to that.

13   Finally, in my litany of stuff to trace

14   my way back, the 1927 Act added the pretense, if

15   not the reality of uncertainty. Instead of

16   licenses being stable and secure, licenses outside

17   the public safety national security area realm for

18   commercial transition, excuse me, for commercial

19   transmissions were to be of very limited, shall be

20   to revocation according to a broad and imprecise

21   standard.

22   Many of these policies still today

23   remain in some form or other and I think we've come

24   to regret each of them. There are a couple other

25   traditions that I think trace back to 1912 that I

1   think are very positive, but I'd like to mention

2   them for a minute. One is a willingness, notice I

3   said willingness, not eagerness, a willingness, if

4   not eagerness over time to innovate.   The

5   Commission has, for example, allocated spectrum for

6   narrow specific purposes or for broad flexible use.

7   The Commission has tried several different ways to

8   assign licenses for allocated spectrum. Among them

9   are comparative hearings, unlimited sharing,

10 mandated sharing, first come, first serve,

11 lotteries, auctions, and in what I call a spectrum

12 policy oxymoron, the Commission is even authorized

13 unlicensed services. So I think that there is in

14 this 90-year history a rich variety of innovation,

15 sometimes it wasn't always the Commission's idea,

16 sometimes it dragged kicking and screaming into it,

17 but there might be an awful lot of information we

18 could glean by looking backwards.

19   Another positive part of the tradition

20 that's now been with us for 90 years, I think, that

21 deserves note is that this spectrum policy has been

22 carried out first by the Navy, then by the Federal

23 Radio Commission, but since 1934 by the Federal

24 Communications Commission, with the almost complete

25 absence of scandal or self-dealing.   This is an

1   area that is fraught with danger for scandal or for

2   misbehavior and I think it is noteworthy and

3   important to say that although the Commission may

4   have made mistakes, they have been made in good

5   faith by women and men of integrity and I think

6   that everybody who works for the Commission and

7   I've been privileged on two different occasions to

8   be such a person, should in my view be proud of

9   that fact and I would hope that the task force will

10 take note of that fact that spectrum policy has

11 been conducted with integrity and will pay

12 attention to the need to make sure that that is

13 something that continues as part of what its final

14 report will note.

15   So much for my historical look back.

16 What about the economics? What are some of the

17 lessons we've learned in the past 90 years? Why do

18 we reject many of these early policies, as I

19 suggested we have?

20   Well, I think the most important lesson

21 we have learned is that Nobel laureate economist

22 Ronald Coase was largely correct, although I'm sort

23 of tempted to say Commissioner Abernathy is largely

24 correct because she described a set of rules that

25 would have made Ronald Coase very, very happy and

1 like her, I agree with it.

2 In my words, not his, Professor Coase

3 said what we need are first of all clearly defined

4 spectrum property rights, very much like the rights

5 a business or a person might have to a piece of

6 real property, like the land on which you put an

7 antenna or the rights which you might have to a

8 piece of personal property like that antenna. You

9 should have the same kind of rights in spectrum as

10 you do in real or personal property.

11 Secondly, it should be a right to be

12 free of interference from others with the use of

13 that property. The basic right is to be free from

14 interference with the exercise of the right.

15 And third, you should be able to hold

16 those rights with security so that people are

17 willing to invest in those properties and in order

18 to implement these kind of rights, finally, accept

19 where market failure is predictable we can leave

20 the rest to bargaining in spectrum rights markets.

21 If we lay out the principle that we create

22 spectrum property rights in the same way that we

23 create other kinds of property rights, that this is

24 largely a right to be free of interference from

25 others and a duty to be free of interference with

1   others and that we hold these in a secure fashion

2   so that people are willing to invest in the

3   technologies that ride on them.   We can then

4   largely turn to markets.

5   But the other lesson I think we learn

6   from economics and I think this is why the Chairman

7   described this as such a complicated area and one

8   that has attracted so much attention from so many

9   people, there's a second lesson that qualifies the

10   first, I think, from this little quick trip through

11   economics and that is it doesn't mean that one can

12   go immediately to uncontrolled markets in feasible

13   spectrum rights.   One reason is that the United

14   States   has   clearly   defined   obligations   under

15   international law that we're bound to respect and

16   international law doesn't always rest on these

17   kinds of principles.   Another reason is that

18   markets may not always work well, although as both

19   the Chairman and Commissioner Abernathy suggested,

20   I think we have to resist the tendency to be

21   constantly concluding that oh well, the market

22   won't work this time, rather, there ought to be a

23   presumption that they will, but certainly,for

24   example, where one group holds the transmitters and

25   another group is going to hold the receivers, it

1   can be difficult to make markets work.

2   It could also be difficult to make

3   markets work where one use is particularly well

4   suited for a particular piece of the spectrum,

5   particularly if another use is located side by side

6   with it.   That makes it very, very difficult too,

7   to simply rely on markets.   And then we are in a

8   transition period.   Since we didn't start with

9   markets, you can't immediately go to them or you've

10   got to be careful about immediately going to them

11   because you may create problems retroactively.

12   So it's not a simple matter, but Dr.

13   Coase, I think, laid down a path by which we could

14   get there.

15   Well,   with   Coase   establishing   a

16   framework, and using history as a guide, can we

17   discern some hard and fast rules for sensible

18   spectrum policy?   I think we can.   I'll take the

19   Chairman up at his challenge or suggestion to start

20   with the easy and go to the hard or to start by

21   noting some things that I think we've probably

22   achieved and then try to what did you want me to

23   do, think boldly?   Let me turn off the tape for

24   that part.

25   What I've got here are six possible

1 rules for spectrum policy and my goodness, I know

2 there to be others as well and I've got them in

3 increasing order of the difficulty of implementing

4 them. So the easiest is first.

5 Number one, whenever possible, let

6 markets, rather than the Commission determine who

7 are suitable providers of particular authorized

8 services. Auctions aren't perfect, but unless the

9 best is to be the enemy of the good, they should be

10 here to stay, I think. I think that's a policy

11 that's easy to implement because it's largely

12 enshrined in law and one that I think the

13 Commission is in touch with already.

14 Next, most difficult, but I think a

15 good basic principle is that for newly authorized

16 spectrum, you should put as few restrictions as

17 possible on the use to which the assignment can be

18 put. I think we've learned that we're not well

19 served by having a Commission decide what is the

20 use for which this spectrum will be made as opposed

21 to leaving it to the flexibility of the licensees

22 over time, as markets, technology and consumer

23 demand change.

24 Third, basic principle I would suggest

25 and now it gets a little harder because we may have

1 to and I didn't take the Chairman up on his

2 suggestion, I'm sorry to draft the statute and show

3 you exactly where it goes, but I would be happy to

4 do that at a subsequent time.

5 I think that another policy should be

6 that in specifying the licenses to be granted, we

7 should focus not on what one may do or transmit,

8 but on the extent to which one must refrain from

9 interfering with others and is entitled to be free

10 of interference from others. The catch phrase for

11 that would be that you don't focus on inputs. You

12 don't have rules about what antennas to use, but

13 you focus on outputs. You focus on okay, this is a

14 license that says you're entitled to be free of

15 this amount of interference and you're entitled to

16 create no more than this level of interference to

17 anybody else. I think moving away from command and

18 control licenses, and I noticed from reading what's

19 been going on, that these kinds of issues have

20 already begun to be discussed, for example, in the

21 context of software-defined radio and other issues

22 before this panel and I would applaud that.

23 Fourth, adopt the policy that is

24 planned, not reactive. This will not be easy to

25 do, partly because there are so many issues on the

1 table at any one moment. But if we are going to

2 dig out of the apparent morass of issues that are

3 staring us right in the face, I suggest the only

4 way to do it is either to put them behind us or at

5 least have a group, hopefully, it will be this one

6 that puts that behind us and looks at trying a

7 planned spectrum policy that looks at least a

8 decade down the road as to where we hope to go.

9 And what uses we hope to put spectrum to.

10 Fifth, and getting terribly difficult,

11 I would hope that the Commission would adopt as a

12 principle that when spectrum is allocated it has a

13 plan for what to do if it doesn't work after the

14 licenses are granted.

15 Now, of course, I wish the Commission

16 did this all the time. I wish every Commission

17 rule had at the end of it here is a statement of

18 what we're trying to achieve and if the following

19 things don't happen, we'll repeal the rule.

20 The Code of Federal Regulations in

21 Volume 47 would shrink substantially were that

22 done. For example, but what I mean here is if a

23 new service is proposed and spectrum is freed up

24 for the service, I think the Commission would be

25 well served for it to identify clearly what should

1 happen and when if the service doesn't materialize,

2 whether that's for technical reasons or economic

3 reasons. The most important question to address

4 before the question is in front of you is if that

5 kind of failure occurs is the Commission going to

6 try to quote fix it by finding more or better

7 spectrum for the existing service or by authorizing

8 new service for that spectrum or will it leave the

9 quote fix to flexible use licenses? I think

10 thinking out those problems when you are

11 authorizing the service in the first place is the

12 way to avoid the politicization of some of these

13 issues. I know it's a very difficult thing to do.

14 Finally, and most difficult to

15 implement, but I think a basic principle that would

16 serve the Commission well is take responsibility

17 only for the spectrum, not the service. This is

18 the hardest rule of all to implement, not because

19 it requires a change in the law, but because it

20 requires a change in attitude and violating a

21 cardinal tenet of Agency practice. That tenet is

22 that you do not ever concede that you are not

23 omnipotent.

24 (Laughter.)

25 You do not ever concede that you can't

1 fix any problem. On the other hand, we all know

2 that we are not omnipotent and not even the Federal

3 Communications Commission, where I've already told

4 you I've been proud to be an employee here on two

5 different occasions.

6   So when confronted with a new

7 technology that appears capable of interjecting

8 happiness into the lives of consumers or huge

9 efficiencies into the balance sheets of producers,

10 or preferably both, I think the Commission would be

11 well advised to promise that service to no one, to

12 make spectrum decisions that permit the service to

13 materialize should it turn out to be economical and

14 practical and to make it clear that we can have the

15 service when and if we're willing to pay for it and

16 if we're not, we won't. I know that will be a hard

17 one to implement, but I suggest it would be.

18   In any event, those are Krattenmaker's

19 six principles for the panel to think about. I

20 decided to leave for the end the title of my

21 remarks because I thought it would make more sense

22 at the end. I've decided that this should be

23 entitled "Thank Goodness Dr. Coase was not on the

24 Titanic."

25   (Laughter.)

1   Thank you and good luck.

2   (Applause.)

3   MS. VAN WAZER: Thank you, Tom.   Tom

4   was my anti-trust law professor more years ago than

5   I'd care to admit and you were a tremendous

6   professor then and it's a privilege to continue to

7   learn from you today.

8   Now we've got his lecture on tape, so

9   if my notes aren't good enough, I can review the

10 tape.

11   With that, I'd like to introduce Dr.

12 Paul Kolodzy, Director of the Spectrum Policy Task

13 Force.

14   DR. KOLODZY: Good morning.   And I

15 guess I play dual role today.   Usually, I'm up

16 there talking about what the task force is about

17 and passing it on to the moderators.   Today, I'm

18 going to do a little bit of both.   I'm going to

19 actually help in the moderation task.

20   First of all, I'd like to thank both

21 Chairman Power and Commissioner Abernathy and

22 Professor Krattenmaker for their great remarks this

23 morning.   They teed up a lot of the issues that

24 we're trying to deal with.   In fact, today's panel,

25 excuse   me,   today's   workshop   on   rights   and

1   responsibilities actually tries to address a lot of

2   those issues and I hope that we have some lively

3   discussions today and I hope to hear a lot from the

4   audience for their comments.

5   The Spectrum Policy Task Force, for

6   those who do not know, is trying to take a future

7   look at spectrum policies and trying to understand

8   exactly where we're going.   So we're trying to

9   actually address one of those issues that, in fact,

10   came up which is how do we look forward and how do

11   we actually try to be more proactive versus

12   reactive?   And so the Task Force is focusing on

13   that and in fact, since this is a large activity,

14   we took four workshops to actually pull off all of

15   the information, try to pull all the information

16   together.   This is the last of those workshops and

17   for those who do not know, you can actually go on

18   the web, on the FCC website and actually get a

19   whole of these workshops and actually review them

20   at your leisure.   And I recommend you do that if

21   you have any questions in the sense of those four

22   areas.   If you remember, we had areas on license

23   and experimental use.   We also had things, a

24   workshop on interference, on spectrum efficiency

25   and then finally this workshop.

1   I'd also like to take a few moments

2   here, this is the last workshop.   We pulled off

3   four workshops in 8 days.   I think that's a record

4   in somebody's books here at the Commission and I

5   think it really comes -- the reason we were able to

6   do that was because of the hard work of Lauren Van

7   Wazer.   I think my Deputy did an unbelievable job

8   to try to pull all of this off and all of the

9   support people that were -- that helped her put all

10   these pieces together and I think that we couldn't

11   do the things we're doing today without their

12   dedication and help, so I'd like to thank them

13   personally for all their help.

14   I also would like to try to tell you a

15   little bit about the schedule what we're on.   Right

16   now, we are on the fourth workshop as we've been

17   saying.   We're going to be trying to put together

18   recommendations and putting out a report probably

19   by the end of October.   That's the goal.   And

20   hopefully, we'll be having interactions between now

21   and then for certain folks, but the idea is to

22   actually put out a report for recommendations to

23   the Commission in that time frame.

24   Today, this panel, the panel is

25   entitled "New Technology in Spectrum Usage Right"

1   is asking really two basic fundamental questions.

2   One is what's happening in the technology area and

3   how is it impacting, what kind of rights we may be

4   wanting to put together. Or second of all, is new

5   technology really an answer to those rights,

6   meaning do you even worry about the rights, you

7   worry about the technology. So should it be

8   technology focus with the rights impacting the

9   technology or should it be that the technology

10 impacts the rights?

11   And I am pleased that I have a

12 co-moderator, Charla Rath, from Verizon Wireless,

13 who's going to help me out today. In fact,

14 hopefully, she's going to take a lot of the lead.

15 I can sit back and listen because one of my roles

16 here is to actually listen to most of the

17 commentary and try to help formulate new ideas.

18   We're going to start off basically by

19 going across the panel and letting them introduce

20 themselves. I've asked each one of them to

21 probably spend no more, like a minute or so,

22 talking a little bit about who they are and what

23 their perspective is, because again, what we're

24 trying to get accomplished today is to actually

25 have the interaction between the panelists and the

1   audience and so please when we break every so often

2   to ask for the audience participation, that is your

3   opportunity to actually come forward and ask some

4   questions. Or make some comments. Either if you

5   have disagreements or commentary that you'd like to

6   bring forth to the panel.

7   With that, I'd like to start off with

8   Peter Pitsch from Intel.

9   MR. PITSCH: First, thanks for inviting

10 me and I want to say I followed a number of the

11 panels and I found them very educational. As Paul

12 said, I am now at Intel, but I did spend 8 years

13 under the black lights of the eighth floor at the

14 FCC and I've thought about these issues for a while

15 and I'll probably be giving you some of my personal

16 views as well.

17   I'm going to try to set a good

18 precedent on the one minute. I want to do

19 basically just give you a gist of what I'm going to

20 say, plant a few seeds and then come back to these

21 ideas in the Q and A.

22   First, i want to incorporate by

23 reference an awful lot of what Professor

24 Krattenmaker said and Tom was a professor for me

25 too, I have to say.

1   (Laughter.)

2   First, I want to say a word about

3   problems, a word about causes and then two reforms

4   that I want to press and give you an idea,

5   hopefully over the course of the morning, some

6   concrete practical ideas about how to go forward.

7   Just a word about problems at the outset.

8   Fundamental problem, artificial scarcity of the

9   spectrum. It's man-made. All things are -- many

10   things are scarce. Most things are scarce, but the

11   problem here is that we have scarcity due to

12   mistakes.

13   Secondly, the cause, again, a lot

14   people have referred to it. The spin I want to put

15   on it is yes, this process is cumbersome and

16   inflexible and so on, but it fundamentally lacks

17   two elements that markets have which is producing

18   objective, decentralized information that can be

19   used in a very decentralized people by people who

20   have an incentive to use it. We'll get into that

21   later.

22   And the reforms, I think the Commission

23   needs to ironically create more flexibility and

24   freedom in two very different ways. It needs to

25   create more spectrum that can be used in commons or

1 explore this opportunity; and two, it needs to

2 create through something I'll explain in more

3 detail, a simultaneous exchange that defines rights

4 and creates voluntary opportunities for spectrum to

5 be more to higher valley uses. I'll get into that

6 in more detail. But basically, I think these are

7 complementary ideas and the Commission needs to

8 move forward on these quickly.

9   DR. FARBER: The name is Dave Farber.

10 I'm a Professor of Telecommunications at the

11 University of Pennsylvania and also a faculty

12 member of the Wharton School. I guess I should

13 comment also in my past that I served for a

14 marvelous year at the FCC as Chief Technologist

15 which probably forever distorted my point of view

16 on things for the better.

17   When I came here I was a technologist

18 who had sort of an interest in public policy and

19 now I find myself totally confused to whether I'm a

20 person, a policy wonk or a technical nerd and

21 hopefully a bit of both. And I commend that that's

22 probably an important thing in the future. As a

23 side bar, I'll be going to CMU for a year where my

24 task is to get the nerds to talk to the wonks.

25 It's going to be interesting.

1   My point of view on spectrum policy is

2 I think well outlined in the submission that Gerry

3 Faulhaber, also of Penn, and I submitted to the

4 FCC's on-line system, copies are available on

5 request. So I won't go over that, except in the Q

6 and A.   Let me just make some brief comments

7 outside of that paper.

8   I think one of the most interesting

9 events of the last several years is the tremendous

10 surge of interest in the unlicensed spectrum, 802,

11 the WiFi systems. And that's had several important

12 things. First, it's become a keystone in the way

13 computer deployment is done nowadays. When I was

14 over in Tokyo a little while ago, Sony now makes a

15 TV set that talks to the bay station over a WiFi

16 link and you can carry the TV set with you. You

17 don't have to carry everything else with you. It's

18 just becoming ubiquitous, access points are now the

19 size of a pack of cigarettes. That's done two

20 things. It's made wireless something that every

21 citizen sees, I hate the word consumer, every

22 citizen sees and it's turned on a whole generation

23 of young kids who never thought that there was

24 anything interesting in the radio space and

25 suddenly you're beginning to see kids who now think

1   of things like agile radio and software-defined

2   radios as an interesting thing to look at as high

3   school kids and maybe as career.   And that

4   certainly is productive for all of us to do.

5   Agile radios, the software-defined

6   radios, I think are going to be an extremely

7   important technology in the future and one of our

8   opportunities is to make the policy make the

9   technology in these areas.

10   I have two additional brief points.

11 Security is becoming a much more important part of

12 our life after certainly 9/11, but it's been that

13 way for quite a while.   Current attitudes towards

14 it in the airways, to put it mildly, amateur day

15 and getting secure, reliable, robust technology is

16 going to be increasingly more important.   Many of

17 the new technologies allow us to do much better in

18 that area.   We have to make sure that our policy

19 doesn't stop it which it has occasionally in the

20 past, not FCC as much as other policies.

21   And finally, I can't resist a comment

22 that I think the Chairman said that I have to

23 slightly amplify and that's the Congress.   When I

24 was here, I remember a marvelous visit to the Hill

25 where a Senator, I won't mention who, called me up.

He wanted to become the internet Senator, so I
went up and spent two hours and he started with
"now tell me what is the internet?"

(Laughter.)

MR. SHARKEY: I am Steve Sharkey. I'm
with Motorola. I'm the Director for Spectrum and
Standard Strategy in the Washington Office here. I
admit that I also spent some time at the FCC, 11
years, winding my way through various bureaus and
working on spectrum issues. I'm seeing it now from
the other side and an interesting perspective to go
back and forth between the two, but I know a lot of
difficult issues that the FCC is dealing with and
they are difficult issues.

One thing that I think we are seeing in
a lot of the Commission's or Chairman's comments
hit on is the need for greater flexibility of
services and that is a good thing to allow
different services to develop and not put a lot of
constraints on the type of services or technologies
that are implemented.

One of the things I think we need to
keep in mind though is these have to be done in a
coherent, technical framework that helps to limit
interference between the services and provide some

1   certainty about the operation of a licensee. That

2   will also help ensure some efficient use of the

3   spectrum, that there's not a lot of the spectrum

4   that's use for guard bands are wasted, kind of

5   protecting yourself against incompatible neighbors

6   or large changes in neighbors.

7   Also, one of the things that do need to

8   be addressed is the need to clearly define the

9   licensee rights and a number of the previous

10   speakers touched on that, but again a certainty to

11   drive the investment in deployment of large-scale

12   services really goes to that need to define the

13   licensee's rights, to be protected from

14   interference and while also allowing some evolution

15   of services.

16   The Chairman also hit on one of the

17   keys here too and I think Peter's comment about the

18   artificial scarcity of spectrum is a good one, the

19   need to work more closely and align our policies

20   between NTIA and FCC and that we have a system now

21   that is a difficult system to work with, no real

22   coherent way to work between the two agencies and

23   no consistent policies between commercial and

24   government uses of spectrum. So that is certainly

25   an area that we need to address and I know the

1 Commission and NTIA have both made a lot of strides

2 in working together. I think we have a long way to

3 go to get beyond some of the difficulties the

4 agencies have in moving past the -- you know,

5 protecting their constituencies and kind of going

6 off in the corners to do that protection and to

7 look for new ways to share spectrum and to make the

8 most efficient use possible of that. So I look

9 forward to discussing these and the panel. Thanks.

10 MR. TAWIL: Thank you, Victor Tawil,

11 Senior Vice President of the Association for

12 Maximum Service Television. It is a technical

13 trade association. I've been there for 14 years.

14 Prior to that, I worked for the Commission in

15 various bureaus, primarily in the wireless service

16 and in the OET.

17 I have a small statement. I think that

18 Federal "Titanic" Commission did extremely well for

19 the past 90 years. It stayed afloat and that's

20 good. And I hope it will stay afloat the next 90.

21 In terms of focus, my focus today will

22 be primarily on responsibilities, spectrum

23 responsibility. I'm not going to deal that much

24 with spectrum rights, but I do believe spectrum

25 responsibility is the key. Interference mitigation

1   is important. I do think flexibility is the key

2   for innovation.

3   That's it, thank you.

4   DR. KOLODZY: Thank you. Actually, we

5   jumped a bit from that side in.

6   Bruce?

7   DR. FETTE: Good morning. My name is

8   Dr. Bruce Fette. I'm with General Dynamics in

9   Scottsdale, Arizona where I'm the Chief Scientist

10   at General Dynamics. We have recently developed a

11   software-defined radio and have been delivering

12   that to the Department of Defense.

13   In addition, I sit on the Board of

14   Directors of the SDR Forum and I am a large company

15   representative on the SDR Forum Board of Directors

16   and am the Executive Chair of the SDR Forum's first

17   conference to be held on software-defined radio

18   technologies in November in San Diego and we look

19   forward to seeing many of you participate in that

20   conference coming up.

21   Relative to SDR technology, I'd like to

22   say that we have developed the SDR technology with

23   the expectation that it can accomplish dramatically

24   more in functionality than a traditional radio and

25   that in fact we expect that it will be able to

1   demonstrate for the Department of Defense some of

2   the principles that we're trying to expect when we

3   begin to talk about spectrum commons, non-

4   interference, the kinds of protocols that would

5   enable the principles that we're going to be

6   talking about today.

7   Thank you.

8   DR. KOLODZY: Gee?

9   DR. RITTENHOUSE: I'm Gee Rittenhouse,

10   Director of Wireless Technology at Bell

11   Laboratories. To Professor Farber's point I freely

12   and completely admit that I'm a technology nerd and

13   that I have absolutely no experience with the

14   policy, so I actually am really looking forward to

15   this panel session and describing some of the

16   technologies.

17   I do spend quite a bit of my time

18   developing the technologies to make spectrum

19   efficient, both in terms of multiple antenna

20   systems, as well as wireless systems and we've also

21   spent a great deal of time in some of the

22   unlicensed technologies as well. So from that

23   point of view, I think I can contribute a bit.

24   I also thought it was very interesting

25   with Paul's point to see the disposition of